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August 5, 2004  
Date

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Howard Fein, M.D.  
Application No.: 09/919,102  
Filed: July 31, 2001  
Art Unit: 1651  
Confirmation No.: 2446  
Examiner: Jean C. Witz  
Title: SELECTIVE ENZYME TREATMENT OF SKIN  
CONDITIONS  
Atty. Docket No.: HOFE-02

Cincinnati, OH 45202

August 5, 2004

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

AMENDMENT

In response to the Office Action mailed March 5, 2004 in the above-referenced application, please amend the application as follows:

Amendments to the Claims begin on page 2 of this paper.

Remarks begin on page 14 of this paper.

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**LISTING OF CLAIMS**

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (CURRENTLY AMENDED) A method for treating a patient having a condition affecting at least one layer of skin comprising administering in situ a physiologically acceptable formulation consisting essentially of containing at least one hydrolase selective for a layer of skin affected by said condition in an amount and for a duration effective to remove said layer and treat said condition.

2. (ORIGINAL) The method of claim 1 wherein said layer of skin is selected from the group consisting of an epidermal layer, a dermal layer, a subcutaneous layer, and combinations thereof.

3. (CANCELED)

4. (PREVIOUSLY PRESENTED) The method of claim 1 wherein said hydrolase is selected from the group consisting of esterases, glycosidases, proteases, phosphatases, thiolases, phospholipases, amidases, ceramidases, lipases, deaminases, nucleases and combinations thereof.

5. (PREVIOUSLY PRESENTED) The method of claim 1 wherein said hydrolase is selected from the group consisting of trypsin, chymotrypsin, papain, bromelain,

dispase, thermolysin, ceramidase, lipase, glycosidase, deoxyribonuclease, ribonuclease and combinations thereof to treat an epidermal layer.

6. (WITHDRAWN) The method of claim 1 wherein said hydrolase is selected from the group consisting of collagenase, elastase, and combinations thereof to treat a dermal layer.

7. (WITHDRAWN) The method of claim 1 wherein said hydrolase is a lipase to treat a subcutaneous layer.

8. (ORIGINAL) The method of claim 1 where the condition is selected from the group consisting of neoplasms, pigmentary disorders, infectious disorders, follicular disorders, hyperkeratotic disorders, inflammatory disorders, vascular disorders, photo-aging disorders, deposition disorders, connective tissue disorders, and cutaneous cystic disorders.

9. (PREVIOUSLY PRESENTED) The method of claim 1 wherein the hydrolase is selected from the group consisting of trypsin, chymotrypsin, papain, collagenase, pepsin A, elastase, exopeptidases, aminopeptidases, endopeptidases, bromelain, chymotrypsin C, metridin, trypsin, thrombin, plasmin, enteropeptidase, alpha-lytic endopeptidase, prolyl oligopeptidase, bradykinin, plasma kallikrein, tissue kallikrein, pancreatic elastase, leukocyte elastase, chymase, cerevisin, hypodermin C, endopeptidase La, alpha-renin, leucyl endopeptidase, tryptase,

kexin, subtilisin, oryzin, endopeptidase K, thermomycolin, thermitase, endopeptidase So, tissue plasminogen activator, pancreatic endopeptidase E, pancreatic elastase II, urine plasminogen activator, cathepsin B, facain, chymopapain, asclepain, clostripain, streptopain, actinidain, cathepsin L, cathepsin H, calpain, cathepsin T, glycyl endopeptidase, cathepsin S, caricain, ananain, stem bromelain, fruit bromelain, legumain, histolysin, pepsin B, gastricsin, chymosin, cathepsin D, retropepsin, aspergillopepsin I, aspergillopepsin II, penicillopepsin, rhizopuspepsin, endothiapepsin, mucorpepsin, candidapepsin, saccharopepsin, rhodotorulapepsin, physaropepsin, acrocylindropepsin, polyporopepsin, pycnoporopepsin, scytalidopepsin A, scytalidopepsin B, xanthomonoapepsin, pseudomonapepsin, cathepsin E, atrolysin, microbial collagenase, leucolysin, interstitial collagenase, neprilysin, matrix metalloproteinases dispase, thermolysin, V8 protease, ribonuclease, deoxyribonuclease and combinations thereof.

10. (ORIGINAL) The method of claim 1 wherein said administering is selected from the group consisting of topical application, injection, and combinations thereof.

11. (WITHDRAWN) A composition comprising at least one protease selected from the group consisting of trypsin, chymotrypsin, papain, bromelain, dispase, thermolysin, V8 protease, and combinations thereof at a concentration in the

range of about  $1 \times 10^{-5}\%$  w/v to about  $10\%$  w/v in a pharmaceutically acceptable formulation to selectively effect an epidermal layer of skin.

12. (WITHDRAWN) The composition of claim 11 wherein said protease is selected from the group consisting of naturally occurring proteases, synthetic proteases, and combinations thereof.

13. (WITHDRAWN) The composition of claim 11 wherein the concentration of protease is in the range of about  $1 \times 10^{-4}\%$  w/v to about  $10\%$  w/v.

14. (WITHDRAWN) The composition of claim 11 wherein the concentration of protease is in the range of about  $0.1\%$  w/v to about  $3.0\%$  w/v.

15. (WITHDRAWN) The composition of claim 11 wherein the formulation is selected from the group consisting of creams, ointments, lotions, liniments, gels, solutions, suspensions, pastes, sticks, sprays, beads, spheres, microbeads, microspheres, liposomes, and combinations thereof.

16. (WITHDRAWN) The composition of claim 11 further containing a co-additive selected from the group consisting of exfoliants, immunomodulating drugs, cytotoxic drugs and combinations thereof.

17. (WITHDRAWN) The composition of claim 16 wherein said exfoliant is selected from the group consisting of ethylenediaminetetracetic acid (EDTA), ethylene glycol-bis ( $\beta$ -aminoethyl ether)-N,N,N',N'-tetra acetic acid (EGTA), salicylic acid, lactic acid, alpha-hydroxy acids, beta-hydroxy acids, urea and combinations thereof.

18. (WITHDRAWN) The composition of claim 16 wherein said immunomodulating drug is selected from the group consisting of glucocorticoids, tacrolimus, cyclosporin, interferon, ascomycin (SDZ ASM 981), imiquimod, or any of their respective derivatives and their combinations thereof.

19. (WITHDRAWN) The composition of claim 16 wherein said cytotoxic agent is selected from the group consisting of podophyllin, podophylox, cantharadin, and combinations thereof.

20. ((WITHDRAWN)) A topically applied composition for treating a patient having a skin condition affecting at least one epidermal, and/or dermal layer, and/or subcutaneous layer comprising a hydrolase in a pharmaceutically acceptable formulation, said hydrolase in an amount in the range of about  $1 \times 10^{-5}$ % by weight to about 10% by weight of said formulation.

21. ((WITHDRAWN)) The composition of claim 20 wherein said hydrolase is selected from the group consisting of esterases, glycosidases, proteases,

phosphatases, thiolases, phospholipases, amidases, ceramidases, lipases, deaminases, nucleases and combinations thereof.

22. (WITHDRAWN) The composition of claim 21 wherein said hydrolase is selected from the group consisting of naturally occurring hydrolases, synthetic hydrolases, and combinations thereof.

23. (WITHDRAWN) The composition of claim 21 wherein said protease is selected from the group consisting of collagenases, trypsin, papain, bromelain, streptokinase, chymotrypsin, chymotrypsin C, elastases, exopeptidases, endopeptidases, metridin, thrombin, plasmin, enteropeptidase, alpha-lytic endopeptidase, prolyl oligopeptidase, bradyurin, plasma kallikrein, tissue kallikrein, pancreatic elastase, leukocyte elastase, chymase, cerevisin, hypodermin C, endopeptidase La, alpha-renin, leucyl endopeptidase, tryptase, kexin, subtilisin, oryzin, endopeptidase K, thermomycolin, thermitase, endopeptidase So, tissue plasminogen activator, pancreatic endopeptidase E, pancreatic elastase II, urine plasminogen activator, cathepsin B, papain, ficain, chymopapain, asclepain, clostripain, streptopain, actinidain, cathepsin L, cathepsin H, calpain, cathepsin T, glycyl endopeptidase, cathepsin S, caricain, ananain, stem bromelain, fruit bromelain, legumain, histolysain, pepsin A, pepsin B, gastricsin, chymosin, cathepsin D, retropepsin, aspergillopepsin I, aspergillopepsin II, penicillopepsin, rhizopuspepsin, endothiasepsin, mucorpepsin, candidapepsin, saccharopepsin, rhodotorulapepsin,

physisaropepsin, acrocyllindropepsin, polyporopepsin, pycnoporopepsin, scytalidopepsin A, scytalidopepsin B, xanthomonoapepsin, pseudomonapepsin, cathepsin E, atrolysin, microbial collagenase, leucolysin, interstitial collagenase, neprilysin, matrix metalloproteinases, dispase, thermolysin, V8 protease and combinations thereof.

24. (CURRENTLY AMENDED) A method to treat skin comprising topically applying to an outermost layer of skin a composition consisting essentially of ~~[[containing]]~~ a protease in a biologically acceptable formulation in an amount ~~and formulation~~ to selectively remove at least one epidermal layer containing a skin condition to thereby treat said skin.

25. (ORIGINAL) The method of claim 24 wherein said protease is selected from the group consisting of trypsin, papain, bromelain, dispase, thermolysin, and combinations thereof.

26. (WITHDRAWN) A method to treat skin comprising providing a composition consisting essentially of ~~[[containing]]~~ a protease in a biologically acceptable formulation in an amount ~~and formulation~~ to selectively remove at least one dermal layer containing a skin condition to thereby treat said skin.



27. (WITHDRAWN) The method of claim 26 wherein said composition is provided by an administration method selected from the group consisting of topical, injection, and combinations thereof.

28. (WITHDRAWN) The method of claim 26 wherein said protease is selected from the group consisting of collagenases, elastases, and combinations thereof.

29. (WITHDRAWN) A method to treat skin comprising providing a composition containing a lipid hydrolyzing enzyme in a biologically acceptable formulation in an amount and formulation to selectively remove at least one subcutaneous layer containing a skin condition to thereby treat said skin.

30. (WITHDRAWN) A method to target skin treatment of an affected area comprising providing to said affected area a composition consisting essentially of [[containing]] at least one hydrolase in an amount and formulation effective to selectively target skin removal in said affected area.

31. (ORIGINAL) The method of claim 30 wherein said affected area is selected from the group consisting of epidermis, dermis, subcutaneous layer, and combinations thereof.

32. (WITHDRAWN) A method of treating aging in at least one layer of skin comprising providing a ~~protease-containing~~ biologically acceptable composition

consisting essentially of a protease to an outermost layer of affected skin in an amount and formulation to selectively target said affected skin layer.

33. (WITHDRAWN) The method of claim 32 wherein said signs are selected from the group consisting of xerosis, rhytids, loss of skin tone, acilinic damage, fine lines, dyspigmentation, and combinations thereof.

34. (PREVIOUSLY PRESENTED) A method for treating a condition affecting skin comprising applying a composition to the affected skin, the composition containing at least one hydrolase at a concentration selective for regulating depth of skin treatment and applied to an area selective for regulating a radial surface of skin treatment.

35. (PREVIOUSLY PRESENTED) The method of claim 34 wherein the hydrolase is a protease.

36. (ORIGINAL) The method of claim 34 wherein the composition is topically applied.

37. (ORIGINAL) The method of claim 34 wherein the composition comprises a protease and is topically applied.

38. (ORIGINAL) The method of claim 34 wherein the composition is applied one time.

39. (PREVIOUSLY PRESENTED) The method of claim 34 wherein the hydrolase is a protease to treat an epidermal layer.

40. (PREVIOUSLY PRESENTED) The method of claim 34 wherein a relatively short duration of exposure and a relatively low hydrolase concentration is used to treat a condition affecting an epidermal layer.

41. (PREVIOUSLY PRESENTED) The method of claim 34 wherein a relatively long duration of exposure and a relatively high hydrolase concentration is used to treat a condition affecting a dermal layer.

42. (WITHDRAWN) The method of claim 8 where the condition is actinic keratosis.

43. (PREVIOUSLY PRESENTED) The method of claim 8 where the condition is seborrheic keratosis.

44. (WITHDRAWN) The method of claim 8 where the condition is condyloma accuminatum (genital wart).

45. (WITHDRAWN) The method of claim 8 where the condition is verruca.

46. (WITHDRAWN) The method of claim 8 where the condition is molluscum contagiosum.

47. (WITHDRAWN) The method of claim 8 where the condition is basal cell carcinoma.

48. (WITHDRAWN) The method of claim 8 where the condition is squamous cell carcinoma.

49. (WITHDRAWN) The method of claim 8 where the condition is squamous cell carcinoma *in-situ*.

50. (WITHDRAWN) The method of claim 8 where the condition is hyperpigmentation.

51. (WITHDRAWN) The method of claim 8 where the condition is callus.

52. (WITHDRAWN) The method of claim 8 where the condition is corn.

53. (WITHDRAWN) The method of claim 8 where the condition is fibroepithelial polyp (skin tag).

54. (WITHDRAWN) The method of claim 8 where the condition is melasma.

55. (WITHDRAWN) The method of claim 8 where the condition is scar (cicatrix).

56. (WITHDRAWN) The method of claim 8 where the condition is rhytid (wrinkle).

57. (WITHDRAWN) The method of claim 8 where the condition is acne.

58. (WITHDRAWN) The method of claim 8 where the condition is comedone.

59. (WITHDRAWN) The method of claim 8 where the condition is psoriasis.

60. (WITHDRAWN) The method of claim 8 where the condition is atopic dermatitis.

61. (WITHDRAWN) The method of claim 8 where the condition is xerosis.

62. (WITHDRAWN) The method of claim 8 where the condition is rosacea.

63. (WITHDRAWN) The method of claim 8 where the condition is ichthyosis.

**REMARKS**

Claims 1, 2, and 4-63 are pending. Claims 6, 7, 11-23, 26-29, 32, 33, 41, 42, and 44-53 are withdrawn. Claims 1, 2, 4, 5, 8-10, 24, 25, 30, 31, 34-40, and 43 are rejected.

Applicant respectfully requests that the Examiner cancel the withdrawal of claims 26-28, 32-33, and 41 and reinstate these claims for examination for the following reasons.

Claims 26-28 parallel claims 24-25, which are presently under examination, for a dermal layer. Claims 32-33 encompass an embodiment of the method of claims 24-25, presently under examination. Claim 41 depends from claim 34, presently under examination.

Applicant respectfully requests that the Examiner confirm that claims 26-28, 32-33, and 41 are pending.

**CLAIM REJECTIONS UNDER 35 U.S.C. §102**

Claims 1-2, 4-5, 9-10, 24-25, 30-31, 34-37, and 39-40 are rejected under 35 U.S.C. §102(b) as anticipated by the Soviet patent (SU 1685448) and U.S. Patent No. 6,030,612 (the '612 patent). Claim 38 is also rejected as anticipated by the Soviet patent. Applicant respectfully disagrees. Applicant respectfully asserts that the Examiner has not complied with the duty to point out the relevant sections of the references she has applied. While applicant will attempt to completely respond, he requests not to be penalized and that any subsequent Action be non-final to further respond once the Examiner has clarified the basis of the objection.

**Soviet Patent No. 1685448**

Applicant has amended all independent claims except claim 34 to require the enzyme is sole active ingredient, by using "consisting essentially of" terminology. This distinguishes over the Soviet patent which requires enzyme and theophylline and DMSO as active ingredients ("... the agent contains in their capacity as medicinal agents theophylline, trypsin, dimethylsulfoxide ...") in a lanolin-oily base (see "Claim" on the fourth page of Soviet patent translation)).

Applicant's amendment is supported at least at example 1, page 22.

For claims 34-41 (41 properly included for the reasons analyzed above), the Soviet patent does not disclose regulating the depth of skin treatment, as applicant claims, and thus does not anticipate the invention.

**U.S. Patent No. 6,030,612**

The '612 patent discloses a multifunctional enzyme with activities of chymotrypsin, and trypsin, and elastase, and collagenase, and exo peptidase ('612 patent abstract). This does not anticipate applicant's invention at least because use of the multifunctional enzyme cannot be selective, and each of applicant's claims requires selective treatment.

**CLAIM REJECTIONS UNDER 35 U.S.C. §§102(e) and 103**

Claims 1, 2, 4, 5, 9, 10, 24, 25, 30, 31, and 34-40 are rejected under 35 U.S.C. §102 (e) as anticipated by Published Application No. 2003/0021775 or, in the alternative, are rejected under 35 U.S.C. §103(a) as obvious over the published application.

Applicant respectfully asserts that the published application neither anticipates applicant's invention nor renders it obvious. The published application requires pressurized fluid applied in a "stripping" flow (abstract) for collecting skin cells. This is hydrostatic tissue debridement and does not anticipate applicant's method of treatment. Further, it does not render applicant's invention obvious, at least because there is no teaching, suggestion, or motivation in the published application to provide an enzyme composition for selective treatment in a non-pressurized formulation.

#### CONCLUSION

Applicant has included a Petition for Extension of Time with this submission, and authorizes the Examiner to charge the fee of \$210 to Deposit Account 23-3000. If any additional fees are necessary, the Commissioner may consider this to be a request for such and charge any required fees to Deposit Account 23-3000.

Respectfully submitted,  
WOOD, HERRON & EVANS, L.L.P.

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